



### Ethnic Disparities in Colorectal Cancer Incidence and Mortality in Hawaii

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Colorectal cancer is one of the most common cancers in Hawaii. The majority of cases occur among individuals 50 years and older and males are disproportionately affected. Each year, over 600 Hawaii residents are diagnosed with colorectal cancer and nearly 150 die from the disease. The incidence of colorectal cancer statewide has remained relatively stable while mortality rates have decreased over the past thirty years. This parallels the overall trends for this malignancy across the United States.<sup>1</sup> Nonetheless, with an increasingly aging population, the total number of individuals diagnosed with and dying from colorectal cancer continues to increase each year in Hawaii.

There is considerable variation in the incidence of and mortality from colorectal cancer among the major ethnic groups in Hawaii (Figure 1). Japanese men and women have the highest rates of colorectal cancer, although the disparity is more pronounced among men. Between 1996 and 2000, the average annual incidence of colorectal cancer among Japanese men was 82.66 cases per 100,000 population (age-adjusted to the 2000 US population) compared to 67.36 per 100,000 among all men statewide. Filipino women had the lowest incidence of this malignancy (33.25 per 100,000 population) among all sex-ethnic groups.

With respect to deaths from colorectal cancer, between 1996 and 2000, Hawaiian men had the highest mortality rates compared to men overall (23.95 per 100,000 population and 18.26 per 100,000 population, respectively, age-adjusted to the 2000 US population) (Figure 2). A similar, albeit less dramatic, difference was also observed among Hawaiian women who had the highest colorectal mortality rates compared to women overall (13.97 per 100,000 and 11.59 per 100,000, respectively). Filipino women had the lowest death rates from colorectal cancer (8.85 per 100,000 population) among all sex-ethnic groups.

Ethnic disparities in survival among colorectal cancer patients in Hawaii have been observed since the 1960s.<sup>2</sup> A recent analysis found that the disparities in colorectal cancer survival between Hawaii's major ethnic groups have decreased over the past forty years with the exception of Native Hawaiians. Native Hawaiians continue to have the poorest survival of all groups.<sup>3</sup>

Ethnic differences in the diagnostic stage of colorectal cancer are pronounced (Figure 3). These differences are observed for both men and women. Chinese and Japanese had the highest proportion of *in situ* cancers (9% and 10%, respectively). Hawaiians had the lowest proportion of these early cancers (4%). Conversely, Hawaiians had the highest proportion of colorectal cancer diagnosed at the most advanced stages (20%) compared to all ethnic groups.

Regular colorectal cancer screening beginning at age 50 is recommended by the National Cancer Institute and the American Cancer Society beginning at age 50. Screening tests include fecal occult blood testing, flexible sigmoidoscopy, colonoscopy, and double contrast barium enema. Although the relative efficacy of individual tests is currently under scientific review, in general, colorectal cancer screening has been shown to facilitate early intervention, including the removal of pre-cancerous colorectal polyps, resulting in a decline in mortality.<sup>4</sup>

Differences in screening utilization may account for the ethnic variation in colorectal cancer incidence and mortality in Hawaii. A statewide household survey of the Hawaii Department of Health's 2002 Behavioral Risk Factor Surveillance System suggests wide ethnic variation in colorectal cancer screening utilization. Among individuals 50 and over, Japanese followed by Caucasians had the highest use with 46.1% and 40.2%, respectively, reporting ever having a sigmoidoscopy or colonoscopy. Screening was substantially lower among Hawaiians (34%) and Filipinos (24.6%).

These data support the notion that the high incidence among Japanese may at least be partly attributable to more screening compared to other groups. The data do not, however, completely explain the comparatively greater mortality observed among Hawaiians. A recent analysis of Hawaii Tumor Registry data found that although poor survival among Native Hawaiians can be attributed, in part, to a greater proportion of cancers diagnosed at advanced stages, it does not entirely account for survival differences among Hawaiians.<sup>3</sup>

Ethnic variation in colorectal cancer incidence and mortality may also be explained by differences in genetic and lifestyle factors. Approximately 15% of colorectal cancers occur in individuals with a family history suggesting an inherited genetic condition, shared risk factors, or both. Inherited forms of colorectal cancers constitute only a small proportion of all cancers and include familial adenomatous polyposis (FAP) and the hereditary nonpolyposis colorectal cancers (HNPCC). FAP and HNPCC are caused by germline mutations in two specific types of genes, the adenomatous polyposis coli (*APC*) gene and DNA mismatch repair (MMR) genes (e.g., *MLH1*, *MSH2*), respectively.<sup>5</sup> The majority of colorectal cancers occur among individuals without a family history.

Investigators at the Cancer Research Center of Hawaii (CRCH) have studied both genetic and lifestyle risk factors for colorectal cancer. Lifestyle risk factors influencing the development of colorectal cancer were found to include high intake of red meat, low intake of fiber, high alcohol consumption, obesity, lack of physical activity, and smoking.<sup>6,7</sup> CRCH investigators have long observed

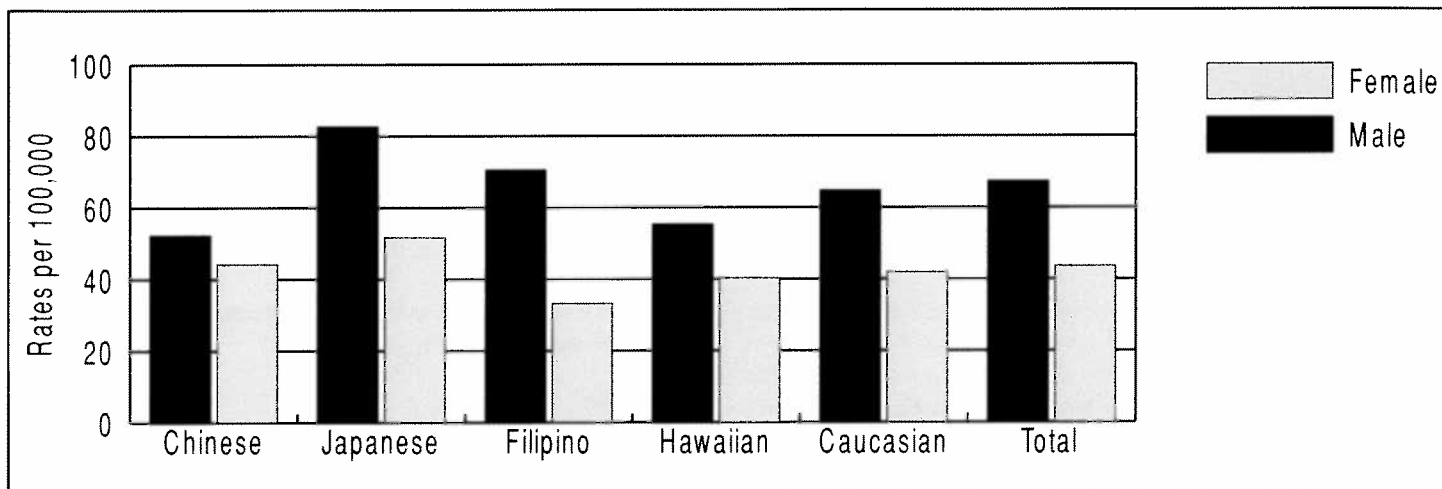


Figure 1.— Incidence of Invasive Colorectal Cancer, Hawaii 1996-2000 (Age-adjusted to the US 2000 Population)

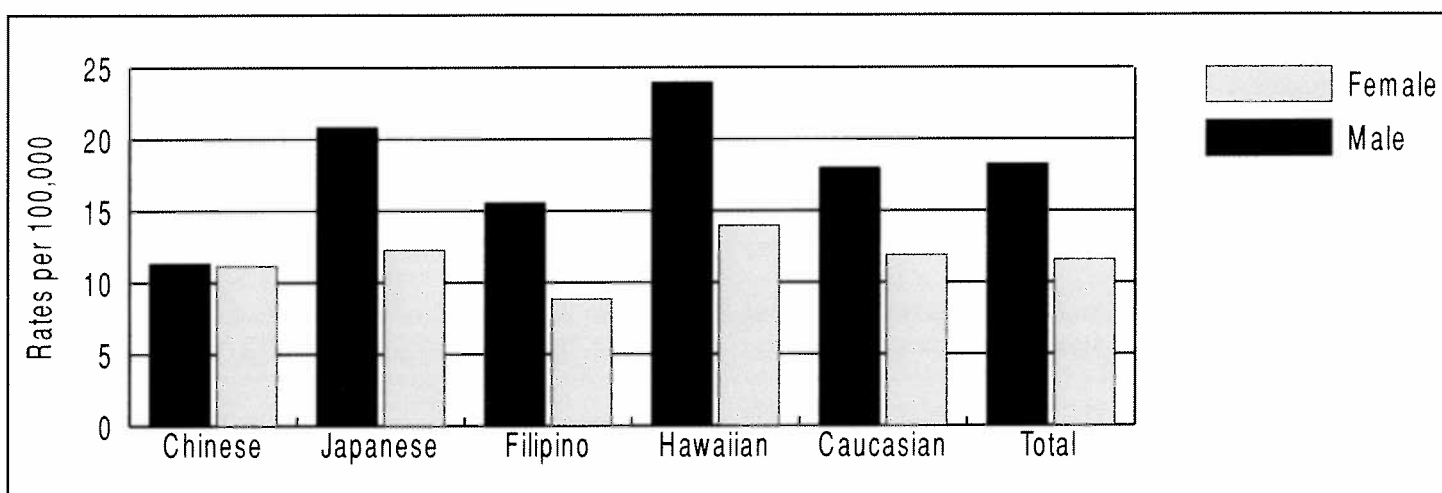


Figure 2.— Mortality from Invasive Colorectal Cancer, Hawaii 1996-2000 (Age-adjusted to the US 2000 Population)

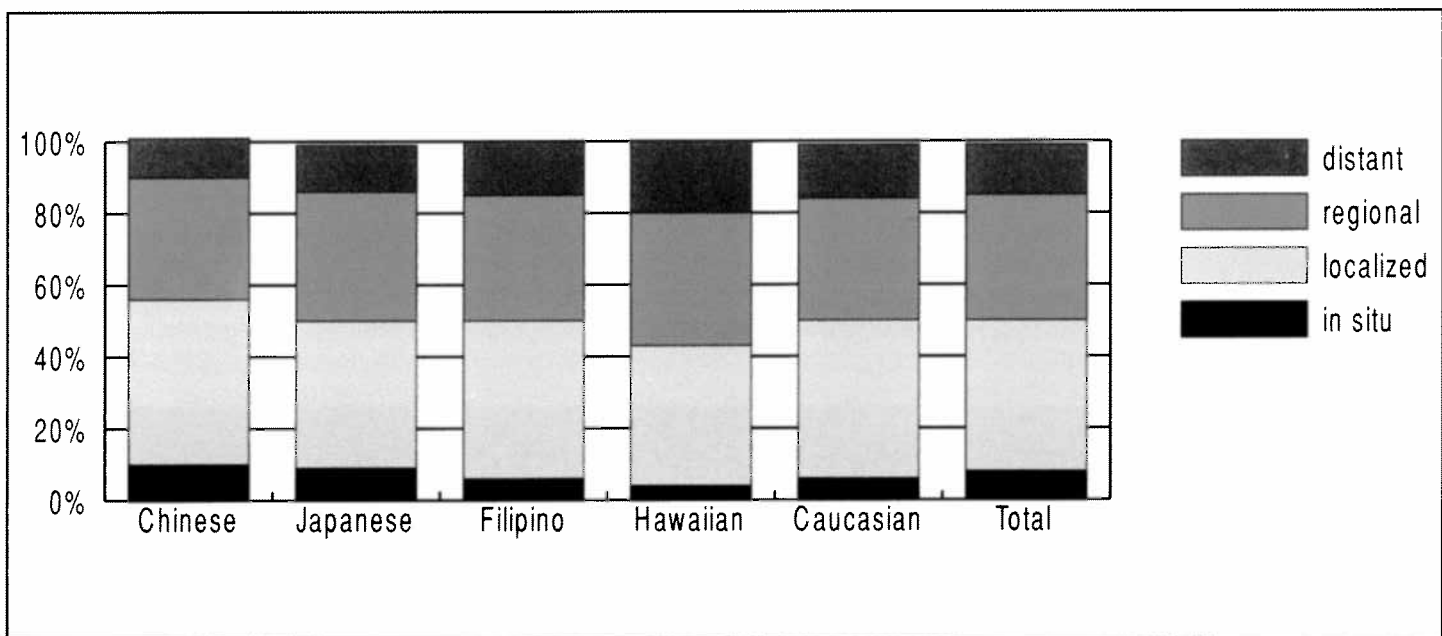


Figure 3.— Distribution of Stage of Diagnosis of Colorectal Cancer in Hawaii, 1996-2000 (Men and Women)

that Japanese immigrants to Hawaii have a substantially increased risk of colorectal cancer compared to Japanese in Japan, as well as U.S. Caucasians.<sup>8</sup> This increased risk has also been observed among Japanese Americans in other parts of the United States.<sup>9</sup> CRCH investigators attribute at least some of this increased risk among Japanese Americans to the adoption of Western lifestyle habits resulting in increased caloric intake, increased body weight, and reduced levels of physical activity,<sup>6</sup> as well as consumption of red meats.<sup>10</sup>

The development of colorectal cancer may also be influenced by genetic susceptibilities. CRCH investigators have observed that relatively common polymorphisms in specific genes controlling the metabolism of carcinogens and/or nutrients can confer susceptibility to colorectal cancer. Moreover, these polymorphisms can interact with dietary or other lifestyle exposures to enhance colorectal cancer risk.<sup>10,11</sup>

Colorectal cancer survival may also be influenced by genetic susceptibilities. In a recent publication in the *Journal of the American Medical Association*, CRCH investigators reported genetic differences by ethnicity among Hawaii colorectal cancer patients.<sup>12</sup> A polymorphism resulting in overexpression of a key cell cycle regulatory protein, cyclin D1, was associated with advanced colorectal cancer among Hawaiian and Caucasian patients but not in Japanese patients. This intriguing finding may, to some extent, explain the more advanced stage at diagnosis and poorer survival among Hawaiians and the comparatively early stage and better survival among Japanese in Hawaii.

Colorectal cancer continues to be a major cause of morbidity and mortality in Hawaii. Disparities among ethnic groups are striking. The high incidence experienced among Japanese likely involves both genetic and dietary influences as well as, to some extent, higher screening utilization. It is not clear to what extent lifestyle

habits including the Westernization of diets will continue to influence cancer incidence in future generations of Japanese Americans in Hawaii. The continued high mortality and poor survival among Hawaiians continue to primarily reflect lower screening rates; but, to some extent, they may also reflect genetic susceptibilities resulting in more aggressive tumors or other biologic differences. Continued research and surveillance is necessary to further elucidate reasons for, and eliminate, the ethnic disparities existing for colorectal and other cancers in Hawaii.

For more information about the Cancer Research Center of Hawaii, please visit our website at [www.crch.org](http://www.crch.org).

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